Address by

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before the

Annual Meeting
Aviation/Space Writers Association
New York, New York

May 26, 1966

It is a privilege - as always - to speak before this group. I recall with pleasure my last appearance before you two years ago in Miami.

This noon I would like to discuss with you NASA's Manned Space Flight programs, our progress, and our prospects for the future.

The elements and capabilities that we are developing in our Manned Space Flight programs constitute a national resource of enduring value which will provide the Nation with the freedom of operation in space necessary to carry out the wide variety of missions that may be required by the national interest. Such freedom of operation is essential to the national security and the preservation of peace in space. Indeed, President Johnson has said that "the avenues of space offer man's best hope for bringing nearer the day of peace on earth."

The Manned Space Flight program includes a national commitment to advance our capabilities to a stage at which it will be possible, within this decade, for man to fly outward a quarter-million miles from the Earth, land on and take off from the Moon, and return safely to Earth. Manned lunar flight thus serves as the focal point of a program whose principal goal is to give the United States world leadership in all elements of space activity.

As President Johnson has said, "We expect to explore the moon, not just visit it or photograph it. We plan to explore and chart planets as well. We shall expand our earth laboratories into space laboratories and extend our national strength into the space dimension."

The Nation has made impressive strides in a very short period of time. An essential element in making this progress possible has been the contributions of the information media. The press has rendered invaluable service in keeping the public aware and informed of our activities. This responsible and alert reporting, plus the openness of our program, has contributed importantly to uniting and galvanizing national support for our goals in space.

In the two short years since I last appeared before you, significant achievement has been made in both of our Manned Space Flight Programs - Gemini and Apollo. It is surely unnecessary to recite all of these accomplishments before this group. However, it may be of interest to examine briefly some of the major events that have taken place during this brief period of 24 months.

In May of 1964, we had just flown our first unmanned test flight of the Gemini-Titan II space vehicle - on

April 8, 1964. The first manned flight - the 3-revolution mission of Gemini 3 - was still 10 months down the road.

Today, in May, 1966, we have conducted eight Gemini flights - six of them manned. Twelve astronauts have logged more than 1300 man-hours in space, and traveled some eleven million miles - almost 50 times the distance from the Earth to the Moon. On one flight alone, Frank Borman and Jim Lovell flew the equivalent distance of more than 10 1/2 trips to the moon and back.

We have conducted the first extra-vehicular activity using a self-propulsion unit. We have demonstrated precision spacecraft maneuvering, culminating in the first rendezvous and docking in space, and in controlled spacecraft re-entries. And we have performed many significant scientific, technological and medical experiments. All of these operations are essential to the Apollo lunar missions: to the construction, maintenance, and use of space stations; and to other space operations of the future.

Excellent progress has also been made in the Apollo Program. Last July, we completed the basic Saturn I program with a perfect record of ten successes in ten launches - a record without parallel in the development and operation of large launch vehicles. In fact, the

development of this vehicle was so successful that we were able to declare it operational after the sixth flight, instead of the tenth as originally planned. The last three flights carried Pegasus micro-meteoroid detection satellites.

In January of this year, another important development program was successfully completed with the fifth launch of the Little Joe II vehicle. This was the last of a series of unmanned ballistic flights, using boilerplate Apollo spacecraft, designed to qualify the Apollo spacecraft and the Launch Escape System in a variety of pad and flight abort conditions.

The success of these programs led to the first flight test of the Apollo command and service modules and the Saturn IB launch vehicle on February 26.

In the months to come, we expect to continue this rapid pace of progress. If all goes well, we will conclude the Gemini program this year. In the remaining four Gemini flights we will continue to fly increasingly complex and sophisticated missions designed to further refine our rendezvous and docking techniques and to conduct additional manned activities outside the spacecraft.

Although the Gemini 9 mission had to be postponed from its original launch date last week, we expect to

complete most of the major mission objectives in the rescheduled Gemini 9A mission, using the Augmented Target Docking Adapter (ATDA). This mission, as you know, is now scheduled for next Tuesday, May 31.

Since the ATDA does not have a propulsion system, it will not be possible to conduct post-docking maneuvers except with the spacecraft OAMS thrusters. However, the ATDA does have a complete rendezvous and docking capability, which should make it possible to conduct all of the rendezvous and docking exercises essentially as planned for the original Gemini 9 flight, as well as the extended extra-vehicular activities.

The rescheduling of Gemini 9 will have some impact, of course, on the schedule for the remaining Gemini missions, although we are attempting to minimize that impact to the best of our abilities. However, it should not result in any delay in the Apollo schedule. In addition, on the remaining Gemini flights we hope to accomplish the objectives not accomplished on Gemini 8 and last week's Gemini 9.

The Gemini 10 mission, scheduled for this summer, will involve a dual rendezvous. The first will be with Gemini 10's own Agena target vehicle, during the fourth revolution. After docking with this vehicle, astronauts

John Young and Mike Collins, will use the 16,000 pound thrust Agena engine to push them into a new orbit and rendezvous with the Gemini 8 Agena, which was placed in a "parking orbit" following the Gemini 8 flight. The mission will include activities outside the spacecraft by Pilot Collins.

The Gemini 11 mission, with astronauts Pete Conrad and Dick Gordon as crewmen, will be a rendezvous and docking flight of up to three days duration. Rendezvous is scheduled in the first revolution. This will require the flight crew to perform virtually all of their own calculations, using onboard systems to compute their trajectories and maneuvers, since there will not be time for ground-based computers to send maneuvering and rendezvous data to them. Ground systems will be used as a backup.

Plans call for the spacecraft to re-rendezvous with their Agena target vehicle, which, procedurally, will be a passive target the second time. The re-rendezvous will also be accomplished with the use of onboard systems.

Extra-vehicular activity is planned, using a hand-held maneuvering unit similar to the one which Dave Scott would have used on Gemini 8. The duration of the EVA and the tasks to be performed will be based

on experience gained in the Gemini 9A and Gemini 10 flights.

Present planning for the Gemini 12 mission includes rendezvous and extra-vehicular activity. An Astronaut Maneuvering Unit (AMU), similar to the one to be used by Gene Cernan next week, will be employed during the EVA. A second, or dual rendezvous, may be accomplished using an Agena from an earlier flight as the second rendezvous target. Detailed planning will also incorporate those objectives not accomplished on previous missions.

We hope that all of the primary objectives of the Gemini Program will be met in the remaining flights.

In the Apollo Program, we now have an Apollo-Saturn launch vehicle erected at each of the three Apollo launch complexes at the NASA Kennedy Space Center - Launch Complexes 37, 34, and 39.

Checkout for the next Apollo-Saturn IB flight is progressing at Launch Complex 37, in preparation for a launch late next month. This mission will test the characteristics in flight of liquid hydrogen, the fuel used in the second and third stages of the Saturn V. This will be an unmanned, orbital flight.

Following this will be a second sub-orbital flight,

this time with recovery in the Pacific Ocean. This will be another launch vehicle-spacecraft development flight, and will evaluate the command module heatshield characteristics at re-entry rates approaching those that will be encountered on re-entry from the lunar mission. Launch vehicle and spacecraft preparations for this flight are on schedule at Launch Complex 34.

The fourth Apollo-Saturn IB mission, currently scheduled for the second half of this year, will be a long-duration orbital mission to further develop the Apollo spacecraft and launch vehicle.

The flight crew for the first manned Apollo-Saturn IB earth-orbital mission, tentatively scheduled for the first quarter of 1967, has been selected. The crew consists of "Gus" Grissom, Ed White, and Roger Chaffee. If all goes well, this mission could come as early as the fourth flight of the Saturn IB.

The duration of the first manned Apollo mission, as presently conceived, will be determined on a "revolution-by-revolution" basis for the first six revolutions, then on a day-by-day basis for up to 14 days maximum. Its orbit will carry as high as 265 statute miles, with a perigee of 100 statute miles. Prime goal of the flight will be to verify the compatibility of the space vehicle,

crew and ground support.

Similar rapid progress is being made in the Apollo Saturn V Program, the "pay-off phase." At Launch Complex 39, NASA's "Spaceport" at Kennedy Space Center, the Apollo-Saturn V Facility Checkout Vehicle (500F) has been erected in the Vehicle Assembly Building. The "power-on" electrical mating and checkout of the ground support equipment was successfully accomplished on May 13.

The hardware for the first actual flight vehicle - Apollo-Saturn 501 - is rapidly completing its final testing and checkout. The first stage is scheduled for delivery to Kennedy Space Center in August. The second stage - the pacing item in the Saturn V and in the entire Apollo Program - is scheduled to be delivered to the Mississippi Test Facility in July for acceptance firing. The third stage has been installed in the test stand at Sacramento and is undergoing its final acceptance firings.

The Instrument Unit is expected to be delivered on schedule to KSC, and the Command and Service Modules are moving smoothly through checkout with no major problems noted. The first flight of the Apollo Saturn V, an unmanned development mission, is scheduled for next year.

From the foregoing, it is clear that today - at the five year mark - we are moving ahead rapidly toward achieving the Nation's goals in space spelled out by President Kennedy in 1961.

The key milestones in the Gemini and Apollo Programs are being met on schedule, and the substantial progress made during the past year provides a basis for hope that the Apollo Program objectives will be successfully fulfilled. However, let no one delude himself into thinking that the U. S. is now ahead of the Soviet Union, or that the Soviets will not win more scientific, technological and ideological victories in space. The competition will continue, and the outcome is still very much in doubt.

The United States program initiated in 1961 was intended to achieve world pre-eminence in space by 1970. However, in spite of our tremendous progress, this Nation has not been able to close the gap. The most critical gap that we face is in the area of manned space flight.

The Russians have the capability to adopt many options and their capabilities will soon reach a point where they could expect success in an attempt to land men on the moon. In fact, there is more chance today than there was a year ago that they will land on the moon

before 1969.

It is still possible for the U.S. to achieve our National commitment of beginning the manned exploration of the moon with this decade, provided we have 100 percent success in every one of the large number of extremely difficult ground and flight tests which are now beginning. The schedule is very tight, with no margin for error. Trouble at any point, or any major setback, or any cut below the present austere level of funding, would require a complete reassessment of our target dates, and of our ability to meet the goal of a manned lunar landing.

I would like to emphasize at this time, however, that the lunar mission is only one of many possible missions using the capabilities which are being created in the Apollo Program.

With this in mind, how can we best utilize the tremendous capabilities we are building up in our present Manned Space Flight programs?

First of all, it is important to remember that the spacecraft and launch vehicles being developed in the Apollo Program are good for flights in Earth orbits of various kinds, and in orbits about the Moon, as well as for landings on the Moon.

By using our capabilities effectively and imaginatively, we will be able to carry out a wide variety

of missions of significant scientific value and of direct benefit to mankind here on earth. Let us consider a few of these potential applications of our space resources.

The amount of weather information obtained from space can be increased to the stage at which it would be possible to program the Earth's entire atmosphere on a computer, and to make accurate long-range weather forecasts for the entire world.

Multi-purpose communications stations can be constructed in space to provide television and radio broadcasting to the entire world, and to meet the ever-increasing requirements for telephone and telegraph channels between continents. Periodic maintenance and adjustments for such weather and communications satellites could be carried out by human technicians.

The use of satellites as control towers in space can help the Federal Aviation Agency to handle the continually increasing speed and volume of traffic on the world's airways, and to prevent loss of life in accidents. In similar manner, they can provide all-weather navigation service for ships at sea, and support for a worldwide air-sea rescue service.

In addition, exploration of the universe can be aided by placing large observatories in Earth orbit.

This will enable astronomers to see the sky clearly, undistorted by the Earth's atmosphere, so that, they can unlock the secrets of the origin of the universe, of the Sun, of the Earth, and ultimately, perhaps, of the origin of life itself.

Scientists and explorers can also survey and study the Moon, to learn what resources are there and what can be learned about the origins of the Moon and its sister body, the Earth.

Looking a little further into the future, one can foresee many additional dramatic and important developments in space exploration. These developments follow a logical sequence that leads from the present programs to large permanent manned space stations, the establishment of permanent bases on the moon, the launching of unmanned probes to every part of the solar system - and manned planetary expeditions as well!

One of the strange aspects of the space program is that we must begin to "go out of business" before we even fly our first operational vehicle. Our experience in the program to develop the Saturn IB launch vehicle illustrates this situation. Although the decline in manpower employed on this phase of the program has been under way for some time, the first flight did not take

place until three months ago, and the first manned flight is not scheduled until next year. By the time manned flights begin, the employment level will be down to about half the level that it was at the peak, which occurred in 1965.

The same anomaly characterizes the overall program. The flights of the Apollo-Saturn V will begin next year after the program has begun its decline, and the manned flights will begin in 1968 after this decline has been under way for some time.

The engineering effort in Apollo is already going down, and manpower is becoming available for new assignments. Nevertheless, this team must be kept together for the solution of problems that have not yet developed during the Apollo missions. In addition, in the next year or so, the time will come for ordering long lead-time components destined for flight after the present program has been completed.

Our space capabilities cannot be mothballed. We must use them or see their value erode. The budget for the coming fiscal year permits NASA to hold open the option for a program to procure additional flight vehicles beyond those now programmed, so as to employ the Apollo hardware, facilities and capabilities at least through

1971. If we do not exercise this option in the decision for the 1968 budget, we will have to begin a phase-down of the manned space flight activities and, in fact, start the "mothballing" of some of our facilities.

At a small fraction of the initial cost we can continue and we can expand our operations in space for the next ten years and more. These operations will have tremendous implications for our national security and for our position of world leadership, in addition to the benefits of scientific advancement and the betterment of man's life on Earth, which I have already discussed.

In terms of our position of world leadership, our space activities represent the most compelling and dramatic demonstration of this country's scientific and productive excellence, and portray a picture of a strong, dynamic "can-do" Nation, able to compete with a formidable rival.

Today, however, the United States is <u>not</u> ahead in this deadly serious competition. It will require a strong and increasing effort to prevent the Soviets from forging ahead as the unchallenged leader in space. The side that slackens will see its chances of leadership lost - both in space and on earth - and, once, lost, this leadership would not be easily regained.

The American public, the information media and the

Congress have consistently supported the space program since its inception. At this five-year mark in the program laid out in 1961 to achieve space pre-eminence, we face our most crucial challenges.

With the continued support of the press, the Congress and the American people, I am confident that we will meet these challenges.